This listing of claims will replace all prior versions, and listing, of claims in this application.

Listing of the claims

Claims 1-26 (Previously Cancelled)

27. (Currently Amended) A method of producing a blank biochip, comprising:

a) providing a substrate;

~~a)~~ b) depositing a layer of material on said substrate; wherein said layer ~~that~~ can initiate and promote the adhesion of a ~~pyrrole and functionalised pyrrole~~ copolymer film comprising a pyrrole and a functionalized pyrrole ~~onto a substrate~~ by electropolymerisation;

c) coating the layer of material with a resin layer; and

~~b)~~ d) producing a plurality of microtroughs in the resin layer wherein the layer of material forms at least a part of the base of the microtroughs.

28. (Currently Amended) The method of claim 27, further comprising ~~c)~~

e) directly or indirectly fixating a biological probe to the functionalised pyrrole by injecting a biological probe solution, in one or more microtroughs in the presence of chemical reagents required for the fixating.

29. (Currently Amended) The method of claim 27, wherein the layer of material is a metallic layer and wherein ~~a)~~ b) further comprises

depositing the metallic layer onto the substrate; depositing a layer of resin or polymer onto the metallic layer; and engraving the resin layer to form microtroughs; and wherein the metallic layer forms at lest a part of the base of the microtroughs.

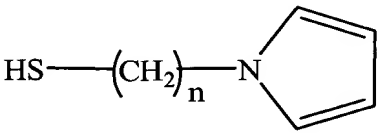
30. (Previously added) The method of claim 29, wherein the metallic layer is a gold layer.

31. (Currently Amended) The method of claim 30, ~~wherein a)~~ which further comprises

chemically treating the gold layer at the base of the microtroughs in the presence of a functionalized pyrrole to form a pyrrole monolayer to the gold layer at the base of the microtroughs.

32. (Previously Added) The method of claim 31, wherein the functionalized pyrrole contains a thiol group.

33. (Previously Added) The method of claim 32, wherein the functionalised pyrrole with a thiol group has the following chemical formula:



wherein n is from 2 to 10.

34. (Previously Added) The method according to claim 27, wherein the substrate is a silicon insert.

35. (Previously Added) The method of claim 27, wherein the substrate is a silicon insert and the layer of material is a layer of silane comprising an alignment of pyrrole sites; wherein the method further comprises depositing a layer of resin on the silicon insert, which is coated with an SiO_2 film; and engraving the resin layer to form the microtroughs, wherein

the SiO_2 film forms at least a part of the base of the microtroughs; and treating the microtroughs with a functionalized silanization agent and a pyrrole to fix the silane layer comprising an alignment of pyrrole sites on the SiO_2 film in the base of the microtroughs.

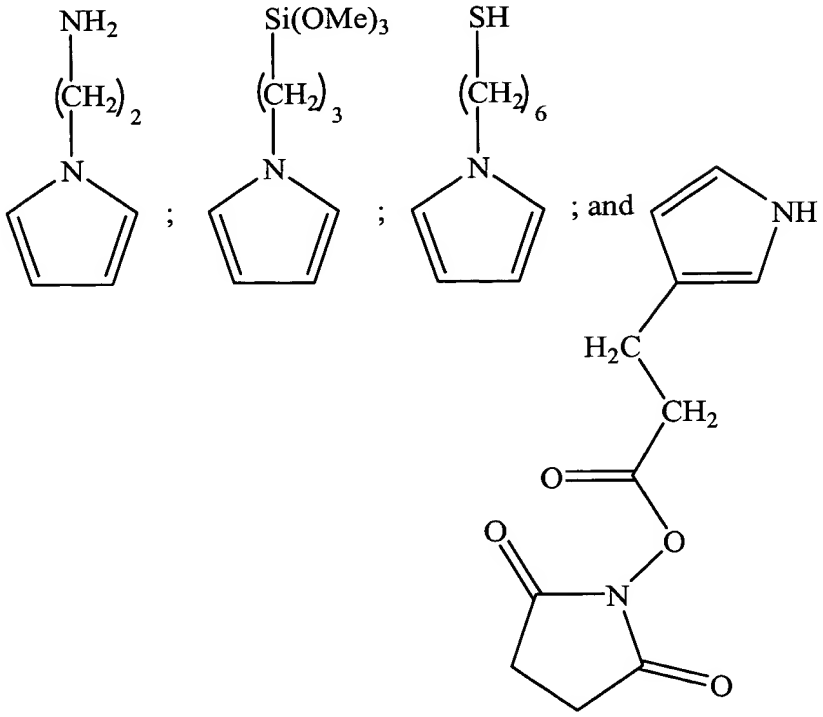
36. (Previously Added): The method of claim 35, wherein the silanisation agent is selected from the group consisting of N(3-(trimethoxysilyl)propyl) pyrrole, a functionalized pyrrole with a $-SiCl_3$, and a functionalized pyrrole with a $-Si(OMe)_3$ group.

37. (Currently Amended) The method of claim 27, ~~wherein b)~~ which further comprises

immersing the structured substrate ~~from a)~~ in an electrolytic bath comprising a solution of pyrrole, functionalised pyrrole, and suitable chemical reagents for electropolymerisation, in the presence of a counterelectrode which is immersed in the electrolytic bath and is independent of the structured substrate, wherein the layer of material forms a working electrode.

38. (Previously Added) The method of claim 27, wherein the functionalised pyrrole is a pyrrole with a group selected from the group consisting of an NH_2 group, a thiol group, an N-hydroxysuccinimide ester group, a trimethoxy silyl group, a carboxyl group, an aldehyde group, and an isothiocyanate group.

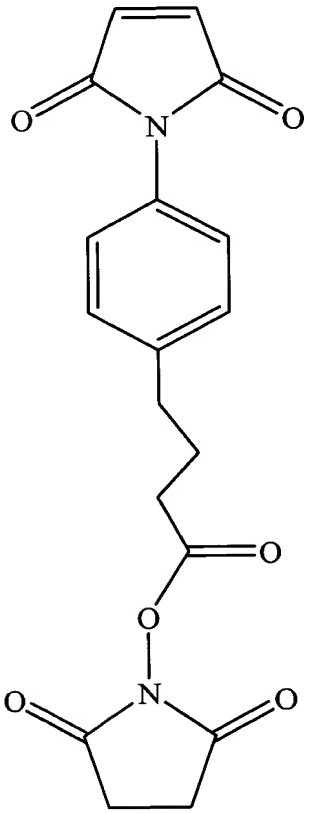
39. (Previously Added) The method of claim 27, wherein the functionalised pyrrole is selected from the group consisting of:

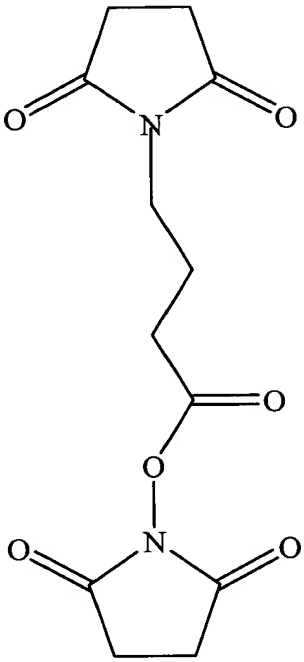


40. (Previously Added) The method of claim 28, wherein prior to fixating the biological probe, the method further comprises collectively fixating a cross-linking agent on the functionalized pyrrole in the presence of suitable chemical reagents, wherein the crosslinking agent comprises a first function enabling its fixation onto the functionalised pyrrole, and a second function enabling the fixation of the biological probe on the cross-linking agent.

41. (Previously Added): The method of claim 40, wherein the cross-linking agent is selected from the group consisting of a dialdehyde, a diisothiocyanate, a diacid, a succinic anhydride, and a derivative thereof.

42. (Previously Added) The method of claim 40, wherein the cross-linking agent is selected from the group consisting of:


;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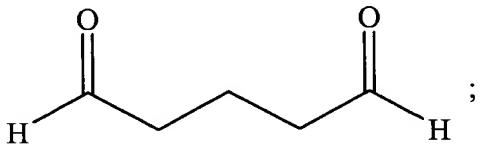
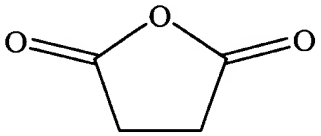
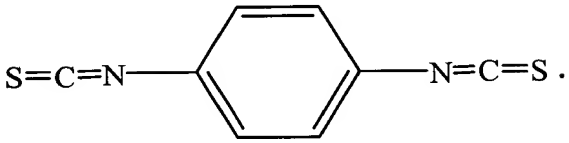

;


; and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43. (Previously Added) The method of claim 28, wherein the biological probe is selected from the group consisting of an oligonucleotide, DNA, RNA, a peptide, a glucide, a lipid, a protein, an antibody, and an antigen.

Claim 43 (cancelled)

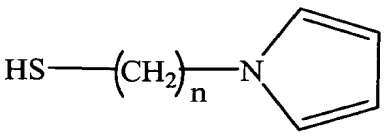
Claim 44 (Previously Added) The method of claim 43, wherein the oligonucleotide is functionalized with a thiol group.

45. (Currently Amended) The method according to claim 30, ~~wherein a)~~ which further comprises

chemically treating the gold layer at the base of the microtroughs in the presence of a functionalised pyrrole to form a monolayer of pyrrole on the gold layer at the base of the microtroughs.

46. (Previously Added) The method of claim 45, wherein the pyrrole is functionalized with with a thiol group.

47. (Previously Added) The method of claim 46, wherein the functionalized pyrrole with a thiol group has the following chemical formula:



wherein n is from 2 to 10.

48. (Previously added): The method of claim 28, wherein the substrate is a silicon insert.

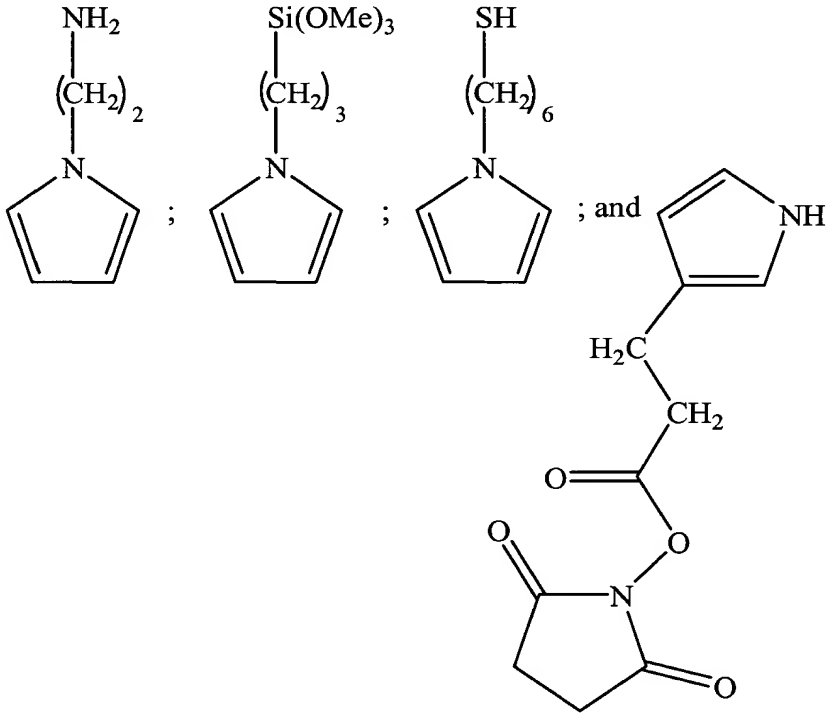
49. (Currently Amended): The method of claim 28, ~~wherein b)~~ which further comprises

immersing the structured substrate ~~from a)~~ in an electrolytic bath comprising a solution of pyrrole, functionalized pyrrole, and suitable chemical reagents for electropolymerisation, in the presence of a counterelectrode which is immersed in the

electrolytic bath and is independent of the structured substrate, wherein the layer of material forms a working electrode.

50. (Previously Added) The method according to claim 28, wherein the functionalised pyrrole is a pyrrole comprising a group selected from the group consisting of an NH_2 group, a thiol group, an N-hydroxysuccinimide ester group, a trimethoxy silyl group, a carboxyl group, an aldehyde group, and a isothiocyanate group.

51. (Previously Added) The method according to claim 28, wherein the functionalised pyrrole is selected from the group consisting of:



52. (Previously Added) A blank biochip comprising in this order: a substrate; a layer of material that can initiate and promote the adhesion of a pyrrole and functionalised pyrrole copolymer film on the layer of material by electropolymerisation; a layer of resin coating the layer of material, forming microtroughs such that the base of the microtroughs is composed at least partly of the layer of material; and a pyrrole and functionalised pyrrole copolymer layer fixed on the base of the microtroughs.

53. (Previously Added) A biochip comprising in this order; a silica substrate; a gold layer or a silane layer comprising pyrrole sites; a resin layer coating the gold layer or silane layer comprising pyrrole sites forming microtroughs such that the base of the microtroughs is composed at least partly of the gold layer or the silane layer comprising pyrrole sites; a pyrrole and functionalised pyrrole copolymer layer fixed on the gold layer or the silane layer comprising pyrrole sites at the base of the microtroughs, wherein the functionalised pyrrole is bound or not bound to a bi-functional cross-linking agent, and an oligonucleotide fixed directly on the functionalised pyrrole or fixed indirectly on the functionalised pyrrole by the cross-linking agent bound to the pyrrole.

54. (re-presented – formerly dependent claim 43(2)) The method of claim 28, wherein the biological probe is a functionalized oligonucleotide and which is fixed directly or indirectly onto the functionalized pyrrole.